

24 (Amended) A portable system to provide breathing gas to a user by decomposing nitrous oxide to a breathable mixture of oxygen and nitrogen, said system comprising the following components:

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- (a) a first storage tank adapted for storing liquid nitrous oxide;
 - (b) a first throttling device in line with said tank, said first throttling device adapted for feeding vaporized N₂O in a controlled manner;
 - (c) a thermal catalytic reactor in line with said valve, said catalytic reactor comprising a means for heating and a catalyst, said catalyst capable of creating a self sustaining decomposition of the vaporized N₂O to a mixture of approximately one-third oxygen and two thirds nitrogen; said catalyst selected from the group consisting of a noble metal or transition metal, on alumina, zirconia, yttria, or a substituted crystalline zeolite support, said catalyst operating at temperatures ranging from about 250°C to 900°C;
 - (d) a second storage tank in line with said reactor, said second storage tank for storing a small surge volume of the resultant breathable gas mixture in a pressure vessel;
 - (e) a second throttling device receiving said breathable gas mixture, said valve feeding the breathable gas mixture in a regulated manner to the user of said system; and
 - (f) a control system in communication with said retainer and said valve for insuring that minimum flow is maintained to sustain reactor temperature and which serves to increase flow to the reservoir when required.

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34. (Amended) The method of claim 25 further comprising a control system in communication with said reactor and a throttling device for insuring sufficient flow to said reactor to sustain said reaction.

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36. (Amended) The method of claim 25 wherein a membrane after the reactor is added to enrich the percentage of oxygen in the breathable gas mixture.

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47. (Amended) The method of claim 34 wherein said throttling device is selected from the group of a valve, pump, expander, orifice, regulator, or combinations thereof.